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BLUE GRAMA GRASS FOR EROSION CONTROL AND RANGE RESEEDING IN THE GREAT PLAINS AND A METHOD OF OBTAINING SEED IN LARGE LOTS

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INTRODUCTION

There is a distinct need for more drought-resistant, palatable, strong-rooted, long-lived range and pasture grasses than are now commercially available. These are needed especially for certain overgrazed and eroding areas of the Great Plains, the Southwest, and the Rocky Mountain States.

Two of the most important native grasses which once grew on these areas in great abundance are buffalo grass (*Buchloe dactyloides* (Nutt.) Engelm.) and blue grama (*Bouteloua gracilis* (H. B. K.) Lag.). Both these grasses have a wide distribution, are excellent soil binders, and are admirably adapted to severe climatic conditions. In addition, they are unusually good pasture plants as regards palatability, curing qualities, and resistance to trampling by livestock. It is apparent, therefore, that where these two species are well adapted, their reestablishment, either from seed or sod may often be highly desirable for soil conservation.

On range lands which have not been too heavily overgrazed and which still support some of the more desirable grasses, improved methods of range management may be expected to effect rehabilitation. Where overgrazing has caused the removal of practically all of the more desirable range plants, or where it is desirable to return abandoned land to grassland, rehabilitation by seeding or sodding, should give maximum returns, provided it can be done cheaply.

EARLIER OBSERVATIONS AND RESEARCH

Observations made in western Kansas by Shantz (14)¹ in 1911, and later confirmed by Savage (13) in 1934, indicate that it takes

¹ Italic numbers in parentheses refer to Literature Cited, p. 7.

from 20 to 50 years for the return of short-grass sod on abandoned areas, formerly cultivated, if such areas are left undisturbed. Since either buffalo grass sod or grama sod, or a combination of the two, make an excellent cover for certain areas in the semiarid regions, a cheap, practical method of reestablishing them in a relatively short time becomes of much value.

A large-scale method of reestablishing buffalo grass by transplanting small cubes of sod to a prepared soil, followed by rolling has recently been perfected by Savage (13). This method has proved more practical than reseeding because of the poor seed habits of buffalo grass and the difficulty of obtaining its seed in large quantities.

The details of a method of reestablishing grama on a large scale have not been worked out, although there is some favorable evidence to indicate that a method can be found.

Workers have been experimenting with the gramas for at least 35 years. Beginning about 1900 and continuing for 15 years many range reseeding and resodding trials were made. Important work was done during this period by Griffiths (2, 3, 4, 5, 6, 7) and Thornber (15) in Arizona, Bentley (1) in central Texas, Sampson (11, 12), who supervised extensive tests on the western national forests, and Kennedy (10), who distributed numerous seed samples for trial throughout the Nation. The results of these trials were well summarized by Griffiths (6) in 1912 when he made important generalizations in regard to the adaptability of the gramas to cultivation. Briefly these were: (1) that all the species² respond readily to cultivation; (2) that side-oats grama (*Bouteloua curtipendula* (Michx.) Torr.), because of its size and habit, is the most promising species for cultivation; (3) that the impracticability of obtaining well-threshed seed of any of the species would militate against their extensive use; and (4) that one of the greatest difficulties in reestablishing native perennial grasses in the semiarid regions is the limited occurrence of years favorable for the establishment of seedlings following favorable seed years.

Since that period sometimes called the "experimental grass garden era", there has been but little progress in the domestication of our gramas until recently, when Wilson (16) successfully used horse-drawn bluegrass strippers for harvesting large quantities of blue grama seed near Estancia, N. Mex. By using these machines, the amount harvested daily ranged from 60 to 200 pounds, depending on the thickness of the stand. When this seed was sown in plots near Mountainair, Estancia, Roswell, and Silver City, N. Mex., a good growth of blue grama was obtained.

HARVESTING AND THRESHING TRIALS

Since the fall of 1934 the Soil Conservation Service has been actively interested in developing the cheapest and best means of obtaining large quantities of blue grama seed. This seed is being used on Soil Conservation Service projects throughout the Great Plains and Southwest. Since there is a strong indication of the

² According to Hitchcock there are 38 species of grama, all American (8, p. 191) and 17 species native to the United States proper (9, p. 511).

continued demand for the seed of blue grama, the experience in harvesting and threshing it is here summarized.

HARVESTING TRIALS, SEASON 1934

The first harvesting trials were made at North Platte, Nebr., between October 10 and 30, 1934, using horse-drawn strippers of the same type as those used by Wilson in New Mexico. About 6,000 pounds of strippings were harvested from 184 acres of grama meadow by two strippers in a 20-day harvest season. On the acre basis, there was a yield of 32.5 pounds of tops which, when threshed, yielded 3.4 pounds of pure seed.

HARVESTING TRIALS, SEASON 1935

The harvesting trials during the 1935 season were in the vicinity of O'Neill, Nebr., between August 15 and 25. Both horse-drawn and



FIGURE 1.—A well-managed, heavy seed-producing blue grama meadow near Crawford, Nebr., in late July 1935.

power-driven strippers were used to harvest the seed from approximately 1,192 acres of grama meadow (fig. 1) for a total yield of 21,469 pounds of seed (sieved and threshed florets). On an acre basis there was an average yield of 18 pounds, which is the same yield as reported in 1931 by Wilson in New Mexico (16). For the average farmer or rancher who might wish to harvest seed of this valuable grass for his own use, horse-drawn machines (fig. 2) are more practical because of the lower investment.³ Outside agencies

³A new horse-drawn machine retails for about \$90 in Nebraska, while a home-made power machine costs from \$225 to \$250.

operating on a large scale will find power machines a distinct advantage in Nebraska because of the ease and rapidity with which they can be moved from one neighborhood to another on their own power and because of the comparatively large acreage one machine can cover each day (fig. 3).²

THRESHING TRIALS, SEASON 1934

At the end of the 1934 harvest season at North Platte, Nebr., the strippings, thoroughly dry, were shipped to Council Bluffs, Iowa, and threshed in a bluegrass threshing machine. The resulting product



FIGURE 2.—Emptying the contents of the hopper box into a burlap sack during grama seed harvest near O'Neill, Nebr., August 16, 1935. Extra sacks are carried on the seat.

came from the machine in two lots of which the purity and germination are shown in table 1.

TABLE 1.—Purity and germination tests¹ of seed of blue grama, Kentucky bluegrass, and sand dropseed harvested at North Platte, Nebr., in October 1934

Lot no.	Amount	Purity test					Germination	
		Pure seed			Weed seed	Inert matter	Blue grama	Sand dropseed
		Blue grama	Kentucky bluegrass ²	Sand dropseed				
	Pounds	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1.....	290	94.18	0.77	-----	0.36	4.69	97	-----
2.....	528	19.45	-----	54.27	-----	26.28	97	68

¹ These purity and germination tests were made by the Iowa State College Seed Laboratory at Ames, Iowa, in January 1935.

² The Kentucky bluegrass was present because the grama strippings were threshed in a bluegrass threshing machine not perfectly clean.

* Tests made at Oshkosh, Nebr., showed that one machine covered 30 acres in an 11-hour day; at Rosebud, S. Dak., one machine covered 25 acres in an 11-hour day. A horse-drawn machine covers 5 to 7 acres a day.

During December 1934, several sacks of blue grama strippings were run through a hammer mill and subsequently cleaned in a fanning mill. It was possible to obtain pure seed by this method with little breakage but the hammer mill proved impracticable for large-scale operations because of low daily output.

THRESHING TRIALS, SEASON 1935

During the season of 1935 at O'Neill, Nebr., the grama strippings were threshed in a way that is practicable for large-scale operations. As soon as the strippings were bagged and concentrated at a central point, they were sieved through an ordinary gravel screen (fig. 4). The siftings were heaped up in long piles and turned over with a

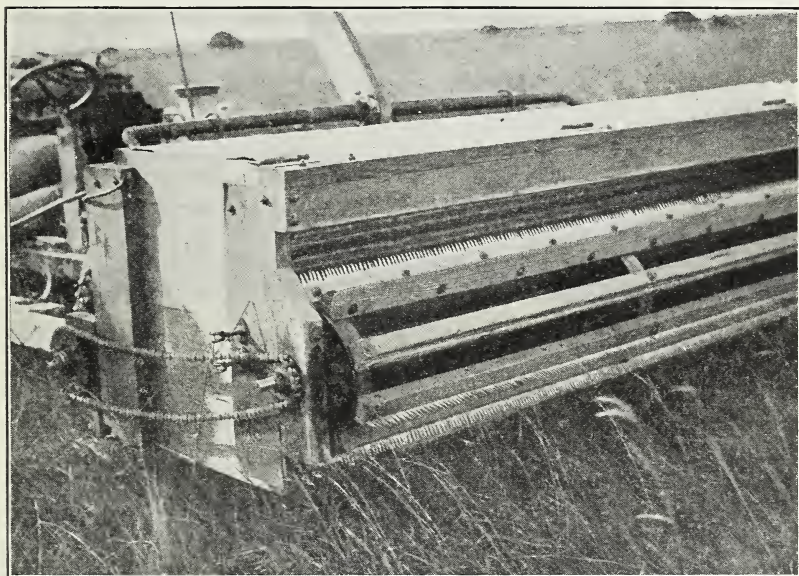


FIGURE 3.—A close-up of the cylinder and hopper box of a power grass-seed stripper used to harvest blue grama seed near O'Neill, Nebr., August 1934.

shovel several times during a period of 10 days until thoroughly dry and all danger of heating was past. The fluffy siftings were then tamped tightly in sacks and after being tagged were ready for shipment. That part of the strippings which still contained some seed and which would not pass through the gravel screen was threshed in an ordinary grain separator (fig. 5) after making several changes.⁵ Purity and germination tests⁶ of the sieved grama and of the threshed grama have been made. The results are shown in table 2.

⁵The details of these adjustments may be obtained from L. C. Newell assistant agronomist, Division of Forage Crops and Diseases, Bureau of Plant Industry, Lincoln, Nebr.

⁶These tests were made by C. B. Lyon, assistant agricultural aid, Soil Conservation Nurseries, Soil Conservation Service, Lincoln, Nebr., in February 1936.

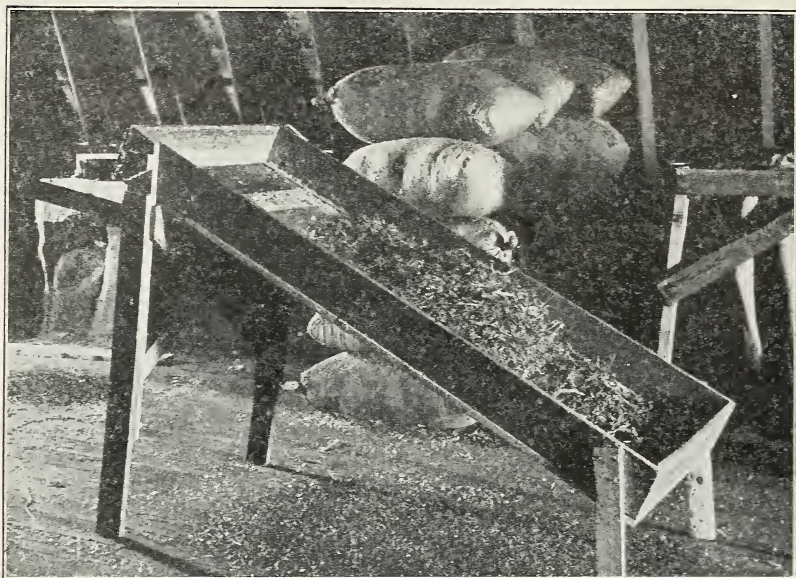


FIGURE 4.—After blue grama tops are harvested with strippers, the strippings are sieved through a gravel screen which is practically the only threshing necessary.

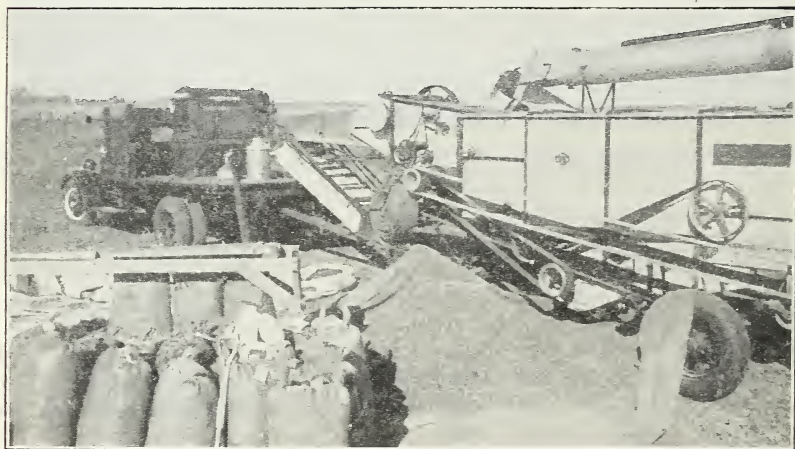


FIGURE 5.—Grama screenings which could not be sieved out with a gravel screen are threshed in an ordinary grain separator.

TABLE 2.—Purity and germination tests of blue grama seed harvested in the vicinity of O'Neill, Nebr., August 1935

Lot no.	Amount		Purity test			Germination of blue grama
	Sieved florets	Threshed florets	Blue grama	Weed seed	Inert matter	
	Pounds	Pounds	Percent	Percent	Percent	Percent
1.....	17.247		23.63	15.44	57.88	28.5
2.....		4.222	14.89	9.57	75.53	70.0

COST OF SEED

The cost of obtaining 788 pounds of seed in October 1934 (purity and germination shown in table 1), was \$626.35 or 79 cents a pound. The cost of obtaining 21,469 pounds of seed in August 1935 (purity and germination shown in table 2), was \$4.115.23 or 19 cents a pound. These costs include all overhead as closely as could be figured.

SUMMARY AND CONCLUSIONS

Until recently, the use of blue grama (*Bouteloua gracilis* (H. B. K.) Lag.) in range reseeding and for reseeding abandoned cultivated lands was discouraged because it was believed good clean seed could not be obtained at a reasonable cost.

Harvesting trials with horse-drawn and motor-driven bluegrass seed strippers at North Platte, Nebr., in October 1934 and at O'Neill, Nebr., in August 1935 have shown that these machines can be economically used to harvest the tops of blue grama.

Threshing trials were made with a bluegrass threshing machine, a hammer mill and fanning mill, and an ordinary grain separator. Seed with a purity of 19 and 94 percent was obtained from a bluegrass thresher at a cost of 79 cents a pound. Seed harvested on a large scale was most economically threshed in an ordinary grain separator, after making certain adjustments. Seed with a purity of 15 and 24 percent was obtained at a cost of 19 cents a pound.

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